

Running Head: TECHNOLOGY IN EDUCATION

Technology in Education
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Abstract

Technology use in schools by teachers and students is increasing and expected. With this comes the need to examine the needs of teachers and learners and their uses of technology. This literature review exams technology use by teachers and learners in online platforms as well as training and assessment practices. There is a general consensus among the studies that teachers and students are not equal in their technology skills and that the use of technology to meet educational goals requires adequate modeling as well as dedicated support and training of all users. Further study of this topic is essential in order to define and qualify technology use among teachers and learners.

Introduction

A current issue in k-12 schools is how to effectively use technology to increase knowledge and meet curricular goals. This is no small challenge, as technology use increases exponentially with greater access to tools and online learning environments such as Virtual High School, Blackboard, and myriad other educational platforms that require online interaction between teachers and learners. There is a strong emphasis to develop "21st Century skills", a concept with varying definitions that ultimately suggest learners need to be able to use technology for purposeful organization and synthesis of information.

Students, teachers, and administrators struggle with themes such as what technology tools work for differing content areas? How can these tools and skills be effectively integrated into current learning environments? What standards exist for work done using computers, the Internet, and multimedia tools? And ultimately, how is learning with technology any better than face-to-face instruction and paper-and-pencil assessments? There are no clear answers to these questions, due to the dynamic and ever-changing spectrum of tools available, as well as the differing curricular goals set by each educational institution. Researchers may study the many different facets of technology use in schools and still have no concrete solution or answers.

Synthesis

The literature was chosen for this review to examine the multiple ideas connected to technology use by teachers and learners. Some of the studies deal with what environments exist, both educational and non-academic, that connect teachers and learners. Also addressed are the attitudes or trends that are notable among teachers and learners when using technology. There is also exploration of what standards, assessments, or evaluations are used when evaluating work done using technology.

As a whole, the studies focus on technology tools, and/or platforms, and/or end results of courses that have been taught using a variety of technologies. Most studies agree that teacher training

and support are paramount the success of any curriculum in which technology use is expected. Some argue that the new technologies available are actually detrimental to student learning and achievement. All of the studies offer various definitions of teacher/learner interaction and link these interactions with online uses of technology. There is an underlying theme that being online, or connected to Internet-based tools and platforms as a teacher or learner, is a trend that will not disappear but increase.

In an attempt to understand fully the different modes of technology use, the articles are intentionally broad in scope in terms of the types of technologies and platforms used and the people who use them. One study examines mobile learning as a pedagogical tool in an introductory sociology course by comparing two groups of college students: those who utilized the mobile technology and those who did not (McConatha, Praul, & Lynch, 2008). Another study, which focused on instructor perceptions, explored whether or not faculty and students at a large mid-western university had mastered on-line communications in web-based courses (Gahungu, Dereshiwsky, & Moan, 2006). Learner perspectives were examined in a qualitative study done by Stodel, Thompson, and MacDonald in order to elicit responses as to what was missing from online interactions with instructors (2006). In Sureshramana Mayya's study (2007), teachers' attitudes toward technology were surveyed. Questions were written to elicit teachers' personal beliefs about technology adoption. To examine assessment, Erdogan Tezci and others worked with educational faculty at a university in Turkey to identify a scale that can be used by teachers to determine the reliability and validity of creative materials done in project-based learning using technology (2008).

The "TPACK" framework of Technological Pedagogical Content Knowledge, developed by Mishra and Koehler and articulated in their paper *Technological Pedagogical Content Knowledge: A new framework for teacher knowledge*, describes how teacher's understanding of technologies and pedagogical content knowledge interact with one another to produce effective teaching with technology (2006). In the *Handbook for Technological Pedagogical Content Knowledge for Educators*, Koehler

and Mishra argue that the development of TPACK by teachers is critical to teaching with technology (2008). Technology is defined by as "the tools created by human knowledge of how to combine resources to produce desired products, to solve problems, fulfill needs, or satisfy wants" and states that "particular technologies have specific affordances and constraints" (5). Also noted is the idea that teaching with technology "forces teachers to confront basic educational issues and reconstruct the dynamic equilibrium between all three elements" (18).

With the definition of technology in place, the following studies seek to further identify what technologies can be useful to further curricular goals and what technologies can impede curricular goals. The availability of effective teaching materials for online learning is discussed in Huijser and Bull's study (2008). They dissect the marketing behind open source software to determine if it is valid or if there are ulterior motives. Open source software is defined as "the process of systematically harnessing open development and decentralized peer review to lower costs and improve software quality". In Huijser's study it was found that in order for open source software to have a real impact on education, there has to be more to it than dumping content into an open course format. Teachers need to be trained and supported in the effective use of free materials.

In The MacArthur Foundation study by Ito, et al., (2008) examines youth practices with technology from a "non-school" framework; i.e., how students spend their personal time on-line and what types of networks they are creating and learning from. The two networks defined are peer networks and interest networks. The peer networks are larger and can be found on sites such as MySpace or within connected gaming platforms marketed by video game companies. The interest networks are small in number but produce dialog that is a way of constructing knowledge. Teachers surveyed felt that these networks were a way to waste time and were not considered valuable in an educational sense.

The study done by Lina Lee (2002) examines how modern languages can be acquired through

synchronous electronic interaction. The study aimed to demonstrate the impact of online, task-based activities that centered around open-ended questions. She found that students benefited from these activities because they had access to different functional skills to construct and negotiate meaning. The impediment of these type of quick, learner-to-learner interaction was that the quality or correctness of the language usage was not examined or revised. However, it can be argued that the goal of communicating in a second language was met by these interactions. This particular study examined interactions on Blackboard and the results revealed that online interactions empower students in modern language acquisition because of the varying means of negotiating meaning.

In Paul Breen's study of a distance learning project to train teachers in Rwanda, a strong point was made about agenda-free assistance when offering open courseware. An Italian university's offerings to Rwandans was the focus of the study and they made every attempt to remove any monetary or cultural agenda and focus on a pedagogical agenda from the offering of training online. The results showed a focus on 21st century skills such as self-direction and cooperative learning in an environment that strove to give to the trainees what they needed in a training model. The study included in-class training observations as well as online training observations. One of the impediments found to learning was a fear by the participants of making a mistake.

Fear of making mistakes was a recurring theme in the studies, which directly correlates to teacher motivation to acquire the technological proficiency necessary for successful implementation of what are essentially new tools. In Mayya's study, it is noted that teachers need training in basic computer skills before they feel comfortable facilitating a course that utilizes technology to a great degree. Additionally, it was found that it is not enough to have basic computer skills. Teachers also need training in how to incorporate technology into their pedagogy.

Another recurring theme dealt with the efficacy of strictly online learning and if it can replace the social interaction that happens in traditional, face-to-face classrooms. Gahungu and others noted

that while there are several encouraging trends in their study, such as easier communication between teachers and learners, easier management of assignments, team building among faculty, and improved instruction, shortfalls were still apparent (2006). The major shortfalls of the on-line model include computer illiteracy, the need for tutorials, lack of teacher orientation to methodologies, and student orientation to “netiquette” or digital citizenship.

In the study by Stodel, Thompson, and MacDonald (2006) it was noted that the concept of “presence” needed to be further developed to new users of technology. “Presence” has varying definitions but in this case, as noted in the above study, Garrison et al. (2001), provides the definition of presence as “the ability of participants...to project their personal characteristics into the community, thereby presenting themselves to other participants as 'real people'” (89). The concept of a “real” learning community was also addressed in the Gahungu study, where the researchers note that students were perceived as un-prepared to project their best appearance online (2006).

Summary

In summary, the literature suggests teachers are still coming to terms with the best ways to integrate technology and facilitate online interactions. While the study by McConatha, Praul, and Lynch (2008) showed that mobile learning was effective in meeting curricular goals, there is still a need for training and support as new programs and platforms are implemented in schools. Some content areas are better equipped to “marry” technology to curricular goals due to the results of integration within the content area, such as modern language learners using online platforms to negotiate meaning (Lee, 2002). There is a wide range of uses of technology within the studies, with a general goal being to identify what works in teacher training and integration and what is lacking. There seems to be less information available about how students use technology to learn informally, perhaps because this may imply that an instructor is not necessary. In the Ito study (2008), it was determined that students *are* learning informally and in non-linear, constructionist ways.

There is a general agreement that online courses, distance learning, digital media and creation of digital artifacts are the ways of the future. The remaining questions are still: what tools work best for what purpose and how can teachers assess and qualify this type of work? What is the best way to integrate technology and train teachers and learners alike to use it in an appropriate manner?

Conclusion

In conclusion, each of the studies addresses technology as something that teachers and learners alike are using, to varying degrees and with varying success, in order to meet curricular goals. There is a strong thread of the efficiency of such tools as well as the pitfalls, which include the need for more training, the need to define digital citizenship in terms of online presence, and the need to conceptualize new rubrics for assessing online creative work. Future research should continue to identify what technology is deemed as suitable for content integration and what platforms are the most efficient for teachers and learners to work together in an online environment. Also, researchers should define the different ways that learners are constructing knowledge aside from direct teacher facilitation in an effort to inform teachers as to what works for the next generation of learners. The current literature presents a great variety of technology tools that are available and how they are being used by both teachers and learners, as well as degrees of proficiency. Overall, the body of literature appears to stress that greater proficiency is required of teachers and more training, support, and modeling of appropriate behaviors is necessary in order to meet learners in the fast-paced, online environments that they are entrenched in. There are clearly many needs presented in the literature with no universal solution as to how to meet them. Further examination of teachers and learners moving into the digital age, alongside the successes and failures of using technology, will undoubtedly continue to be an important topic of research.

Annotated References

Breen, Paul (2007). Lessons from an international e-learning project. *International Review of Research in Open and Distance Learning*, 8(3).

-The author studied the success and failures of a distance learning teacher training model in Rwanda.

Huijser, H., Beford, T., & Bull, D. (2008). Open courseware, global access, and the right to education: Real access or a marketing ploy? *International Review of Research in Open and Distance Learning*, 9(1).

-The authors found that open courseware has the potential to play an important role in assisting people to become or remain socially included.

Gahungu, A., Dereshiwsky, M., & Moan, E. (2006). Finally I can be with my students 24/7, individually and in group: A survey of faculty teaching on-line. *Journal of Interactive On-Line Learning*, 5(2).

-Researchers found that teaching on-line is challenging and that digital citizenship or “netiquette” needs to be taught in on-line learning communities.

Huijser, H., Beford, T., & Bull, D. (2008). Open courseware, global access, and the right to education: Real access or a marketing ploy? *International Review of Research in Open and Distance Learning*, 9(1).

-The authors found that open courseware has the potential to play an important role in assisting people to become or remain socially included.

Ito, M., Horst, H., Bittanit, M., boyd, d., Herr-Stephenson, B, Lange, P., Pasco, C., & Robinson, L., (2008). *Living and learning with new media: Summary of findings from the Digital Youth Project*. Retrieved from <http://macfound.org>.

-The authors studied non-school networks of teenagers and analyzed the importance of these networks in constructing knowledge.

Koehler, M., and Mishra, P. (2008). *Introducing TPACK*. In Colbert, J., Boyd, K., Clark, K., Guan, S., Harris, J., Kelly, M., et al., (Eds.), *Handbook of technological pedagogical content knowledge (TPCK) for educators* (pp. 13-29). New York, New York: Routledge.

-The authors define Technological Pedagogical Content Knowledge as an ill-structured, complex domain.

Lee, L. (2002). Enhancing learner's communication skills through synchronous electronic interaction and task-based instruction. *Foreign Language Annals*, 35(1), 17-23.

-This journal article details how language learners negotiate meaning and form in a social context.

Mayya, Sureshramana. (2007). Integrating new technology to commerce curriculum: How to overcome teachers' resistance? *The Turkish Online Journal of Educational Technology*, 6(1), art. 1.

-The author surveyed teachers in India and learned that there is great resistance to technology due to lack of tools, training, and administrative support.

McConatha, D., Praul, M., & Lynch, M. (2008). Mobile learning in higher education: An empirical assessment of a new educational tool. *The Turkish Online Journal of Educational Technology*, 7(3), art 2.

-The authors studied the use of cell phone networks to deliver tutorials and determined that those networked to the tutorials on the cell phone scored higher on assessments.

Mishra, P., & Koehler, M. J. (2006). Technological Pedagogical Content Knowledge: A new framework for teacher knowledge. *Teachers College Record*. 108(6), 1017-1054.

-The authors define the framework of Technological Pedagogical Content Knowledge.

Tezci, E., Karaca, D., and Sezginsoy, B. (2008). The study of reliability and validity of creative materials. *The Turkish Online Journal of Educational Technology*, 7(10), art 5.

-The authors created rubrics to assess creative work and stress the necessity of a reliable and valid instrument such as portfolio evaluation.